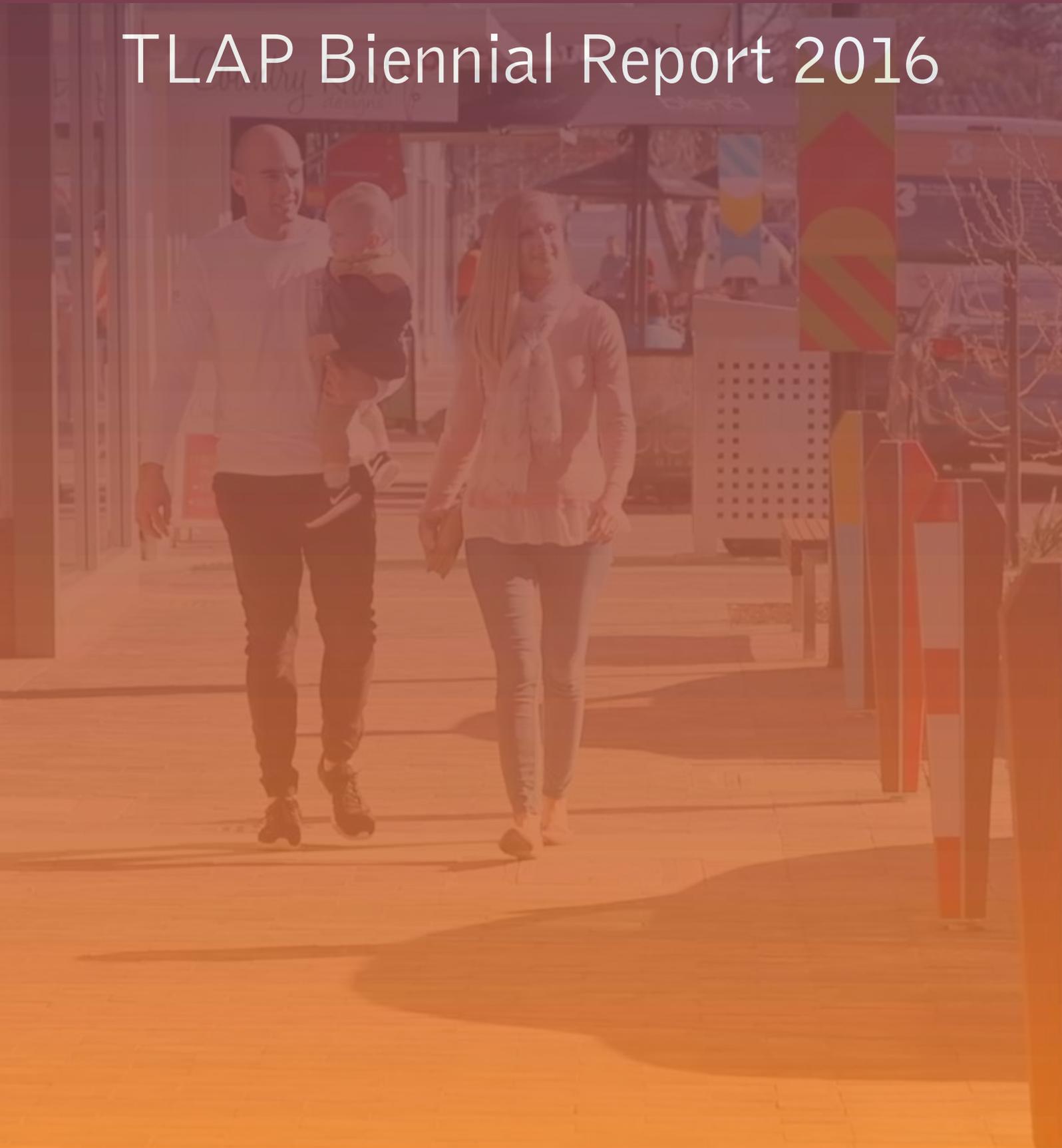




Targeted Lead Abatement Program

# TLAP Biennial Report 2016



# TLAP Biennial Report 2016

## Executive Summary

On 29 November 2012, the Honourable Jay Weatherill MP, Premier of South Australia, set out in a letter to Mr Roland Junck, the then Chief Executive Officer of the Nyrstar NV, the terms on which the State of South Australia proposed to support Nyrstar in connection with any redevelopment of its lead smelter in Port Pirie.

During 2013, personnel from Nyrstar and various departments of the State Government met and identified lead reduction initiatives which might form part of TLAP. Those initiatives, together with their expected costs or estimates where further work was required, were set out in a report, the TLAP Report, which was presented to and subsequently endorsed by the Port Pirie Transformation Steering Committee (PPTSC) – a joint Australian Government, Nyrstar and South Australian Government Committee overseeing the implementation of the Nyrstar Port Pirie smelter redevelopment.

On May 16, 2014, Nyrstar Port Pirie PTY LTD and the State of South Australia signed the TLAP Agreement, specifying the objectives of TLAP, to formalise TLAP's governance principles and to endorse the TLAP Report containing the following objectives:

- (a) to reduce lead exposure of children in Port Pirie more effectively through early intervention, and specifically to increase the percentage of children in Port Pirie aged 0 to 4 years who have blood lead levels within the NHMRC guidelines to up to 95% within ten years after Financial Close;
- (b) to reduce and stabilise legacy lead dust sources in Port Pirie;
- (c) to improve public health planning in Port Pirie; and
- (d) to improve coordination and collaboration among relevant agencies and the local community in the delivery of services to facilitate the achievement of the other objectives of TLAP, including through the development of a comprehensive strategy for partnerships and community participation,

and any other objectives that the parties agree from time to time.

In the three years since then TLAP has made significant progress in each of these areas, with work organised around five subprograms:

- a) Broad-scale Decontamination of Housing
- b) Early Intervention
- c) Legislation and Policy
- d) Community Dust Management
- e) Stakeholder Partnerships and Engagement

An independent review of the activities and programs of TLAP was undertaken in 2015 and confirmed that the committee has shown substantial progress towards meeting its objectives, with various initiatives across multiple sub-programs implemented so far. Action has been taken on the recommendations made as part of that review.

## 1. Background

In 2012, it was recognised that a smelter redevelopment at Port Pirie was needed to reduce emissions of lead to air, reduce blood lead levels in young children in the community, and at the same time improve the commercial viability and sustainability of the smelter through improved technology.

An Environment and Health Feasibility Study was prepared in July 2013 (Thomas et. al. 2013). This study reviewed data from other smelters that have undergone transformation and then made estimates of the likely improvements at Port Pirie.

The redevelopment, involving the replacement of the sinter plant with modern best practice encapsulated bath smelting (EBS) technology, was expected to reduce fugitive lead emissions by 50%. This was later confirmed through analysis carried out as part of the Public Environmental Report (Cooe Pty Ltd).

Historic air quality data at Port Pirie showed that a series of improvements (mainly as part of the 'Ten by 10' program) had reduced annual average air lead concentrations in Port Pirie over the last decade, from around 0.8  $\mu\text{g}/\text{m}^3$  to 0.3-0.4  $\mu\text{g}/\text{m}^3$  at the licensed monitoring sites of Pirie West Primary and Oliver Street. Whilst incremental improvements in emissions performance were possible through improvements in materials handling and increased process stability, a step change reduction in emissions is reliant on technology transformation.

A TLAP Working Group was established to scope and cost the program and to determine the level and apportionment of funding to assist delivery of the agreed initiatives.

State Government and Nyrstar signed an agreement to implement TLAP on 16 May 2014 and have developed TLAP:

- through a partnership approach,
- informed by the findings of the Environment and Health Feasibility Study, and
- building on support for the current and previous programs.

The objectives of the agreement are as follows:

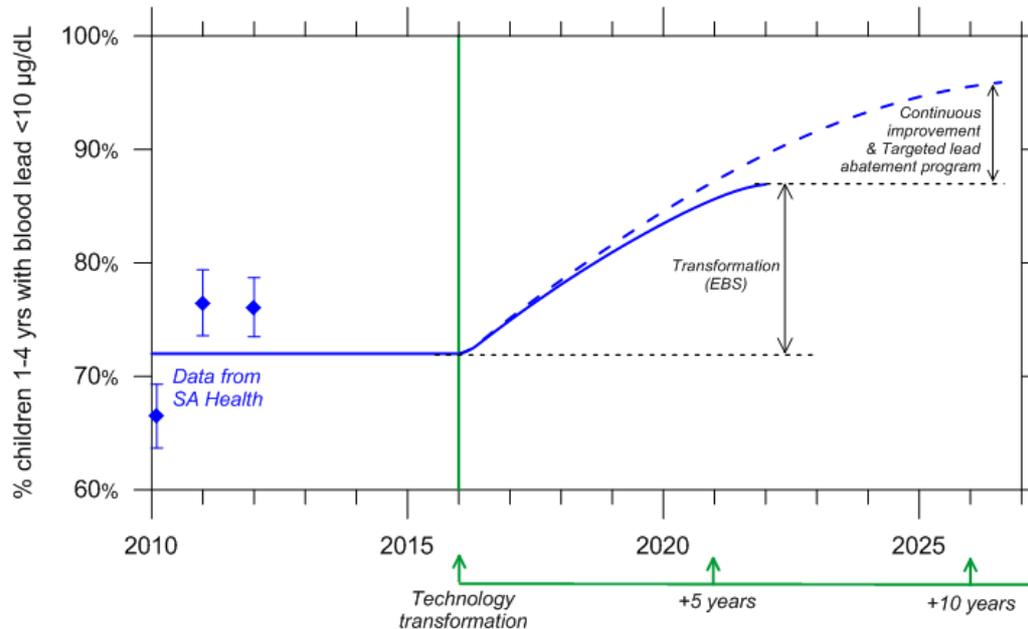
- (a) to reduce lead exposure of children in Port Pirie more effectively through early intervention, and specifically to increase the percentage of children in Port Pirie aged 0 to 4 years who have blood lead levels within the NHMRC guidelines to up to 95% within ten years after Financial Close;
- (b) to reduce and stabilise legacy lead dust sources in Port Pirie;
- (c) to improve public health planning in Port Pirie; and
- (d) to improve coordination and collaboration among relevant agencies and the local community in the delivery of services to facilitate the achievement of the other objectives of TLAP, including through the development of a comprehensive strategy for partnerships and community participation,

and any other objectives that the parties agree from time to time.

To drive the rollout of these objectives, five sub-programs were developed:

1. Broad-scale Decontamination of Housing
2. Early Intervention
3. Legislation and Policy
4. Community Dust Management
5. Stakeholder Partnerships and Engagement

When TLAP was established, its aim was to increase the percentage of children in Port Pirie aged 0 to 4 years who have blood lead levels within the original National Health and Medical Research Council (NHMRC) guidelines (below 10  $\mu\text{g}/\text{dL}$ ) to up to 95% within 10 years. Nyrstar and the South Australian Government have committed to TLAP for a period of up to 10 years. Since then, NHMRC has introduced in 2015 a new Action Level of 5  $\mu\text{g}/\text{dL}$ . While this has led to some reshaping of the TLAP program, the EHC already uses 4  $\mu\text{g}/\text{dL}$  as an action level for its family interventions. TLAP now uses both 10 and 5  $\mu\text{g}/\text{dL}$  as targets for its program. This enables a tiered approach to managing blood lead with more intensive intervention required if children exceed 10  $\mu\text{g}/\text{dL}$ .



**Figure 1** Schematic diagram of estimated increase in percentage of children with blood lead levels below 10  $\mu\text{g}/\text{dL}$  following the introduction of EBS (encapsulated bath smelting) technology in 2016 and implementation of the Targeted Lead Abatement Program (Thomas et.al. 2013)

As set out in the TLAP Agreement (2014), the South Australian Government will continue to contribute approximately \$1.5 million per year, a continuation of its existing Lead Abatement Program budget through the Environmental Health Centre (EHC). Nyrstar’s current commitment of up to \$3 million per annum will be maintained for up to 10 years. Nyrstar will also apply \$5 million as an additional contribution to TLAP in a manner to be agreed between Nyrstar and the South Australian Government to accelerate the implementation of TLAP’s initiatives.

## 2. Original TLAP Sub Program Design

Rollout of TLAP sub-programs began in mid-2014. The Committee purposely followed the following initial structure proposed by the Working Group. Over time the Committee has modified the sub-program activity in response to lessons learned and reviews undertaken.

The initial scope of each sub-program follows:

## Sub-program 1: Broad-scale Decontamination of Housing

### Objectives

- Reduce legacy lead-dust reservoirs in homes and yards, following a step-change reduction in emissions from the smelter following Transformation.

If broad-scale decontamination of housing is to be effective, it should only occur after the Transformation has been commissioned and emissions are substantially reduced.

No further consideration of broad-scale housing activities is proposed until after commissioning, which is expected to progress through late 2017.

## Sub-program 2: Early Intervention

### Objectives

- Review and enhance existing early intervention programs.
- Reduce the exposure of children to lead more effectively through an enhanced preventative program that targets interventions before children reach 2 years of age.

Children 0 to 4 years of age are at most risk from lead exposure. Typically, blood lead levels rise with age from birth in contaminated environments due to a steep increase in the dose children ingest, which is related to their motor development and mouthing behaviour in the first two years of life. Interventions that reduce lead exposure before a child reaches two years of age are likely to disrupt this escalation of blood lead levels, and reduce the peak levels that a child would have reached without intervention. In addition, interventions directed at children under the age of two appear to have greater impacts on reducing children's blood lead levels than interventions delivered after the age of two, suggesting that blood lead levels are more responsive to interventions reducing lead dose during the earlier age period.

For this reason, sub-program 2 defines the key target group as children aged 0 to 2 years, pregnant women, and those children at greatest risk of harm with blood lead levels above 20 µg/dL.

The primary objective of TLAP sub-program 2 is to reduce the exposure of children to lead within the first two years of life. Within this sub program it has been identified that case worker intervention is an effective strategy to support high risk families engage and participate in the behaviour change required to carry out exposure reduction strategies.

Case workers are trained to engage families through assessment, support, education and mentoring, but raising awareness and minimising exposure risk through behaviour alone is not effective without also making changes the child's living environment to reduce access to lead sources.

Caseworkers use a number of tools to assess and review individual clients' needs, type and level of intervention/s, such as: EHC Guideline for Managing Health risks of environmental lead, EHC Social Worker Clinical Priorities tool and Exposure investigation tool (which are also aged specific). This information is used to develop an individualised Action and Intervention Plan, items required to enable the Action and Interventions plan are formally requested and approved via the Healthy Families Team Leader.

TLAP commenced co-investment into Caseworker Resources in 2015.

### Sub-program 3: Legislation and Policy

#### Objectives

- Identify appropriate legislative measures to combat exposure to legacy lead.
- Boost capacity for PPRC to exercise its role and responsibilities as the local public health authority.
- Develop policies under the *Public Health Act 2011* aimed at reducing exposure to historical lead in Port Pirie environs for further and focussed efforts for legacy lead abatement (e.g. urban dust suppression policies and guidance).
- Improve coordination between South Australian Government agencies and local government concerning implementation of legacy lead abatement strategies.

Following Transformation, emissions of lead will significantly decline and legacy lead accumulated over many years in the form of dust will become a more relevant source of lead exposure for children in the Port Pirie community. The legacy lead dust is widely distributed in the city and can readily become airborne and enters dwellings and public areas.

Exposure of the community to legacy lead may be reduced through the application of various policies and legislation, including: 1) development, environment protection and public health legislation; 2) internal policies of government agencies; and 3) development policies in local government. Policies could also be used to improve coordination between government agencies in implementing lead abatement strategies.

### Sub-program 4: Community Dust Management

#### Objectives

- Continuation of current dust suppression initiatives in the community and identify what additional initiatives could be implemented to further reduce exposure in the community.

After more than 127 years of continuous smelter operations, lead contamination in Port Pirie is wide spread with exposed soil and dust deposition being a significant source of lead exposure to children 0 to 4 years in the community. In particular, public spaces can be reservoirs for lead bearing dust that can mobilise and become a source of lead exposure for children 0 to 4 years. By removing or stabilising legacy lead dust in Port Pirie, the risk of lead exposure for children 0 to 4 years can be reduced.

Numerous community-based, lead exposure reduction initiatives are in place to mitigate this exposure, however while current emissions from the smelter continue until commissioning, these initiatives will have a limited effect on minimizing lead exposure from soil and dust in the community

Prior to commissioning of the new facility, the focus for this sub-program is on:

- the continuation of current dust suppression initiatives in the community;
- identifying what additional dust suppression initiatives could be implemented to further reduce exposure in the community.

Additionally, during this phase, TLAP will work to define other significant public areas of Port Pirie that need attention with respect to dust stabilisation and control.



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The former Nyrstar lead abatement program Thumbs Up for Low Levels implemented a range of community initiatives and achieved significant results in reducing lead exposure in the community. It involved both specific community exposure reduction initiatives and initiatives undertaken on Nyrstar's site which have the effect of reducing lead emissions that would otherwise leave the site and reach the community.

## Sub-program 5: Stakeholder Partnerships and Engagement

### Objectives

- Through the development of an enhanced and targeted engagement strategy, ensure continued community engagement, support and ownership of the blood lead reduction program pre- and post-commissioning of the new lead processing facility.
- Foster and develop strong partnerships with key stakeholders, particularly in the community, to assist ownership and delivery of the short and long-term project objectives.
- Develop a comprehensive TLAP Stakeholder Partnerships and Engagement Strategy.
- Raise awareness and inform key stakeholders about goals, objectives and initiatives associated with TLAP and the programs subgroups.
- Facilitate joint ownership and development of the solutions to improving the blood lead levels in children in Port Pirie

Active participation by the community has been a key success factor in reducing lead exposure and children's blood lead levels in Port Pirie over the last 30 years, particularly since 2006. This success has been largely due to increasing awareness and engagement of the blood lead reduction programs by the community. The community led reduction strategies to date have been driven by the Environmental Health Centre and Nyrstar.

Since the initiation of TLAP there has been a paradigm shift in the key messaging, still with a strong focus on reducing lead exposure but importantly to change the narrative around the story of Port Pirie with the outcome being a positive shift in perceptions about the community, from within the community.

## 3. Independent Review (2015)

As required by the TLAP Agreement, in 2015, Dr Amelia Searle was engaged by TLAP to undertake an independent review of the program activities (referred to as the **Searle Review**). Dr Searle was assisted by A/Prof Peter Baghurst and Prof Malcolm Sim. In 2014, Searle and her colleagues published a paper in the journal of NeuroToxicology titled "Tracing the long-term legacy of childhood lead exposure: a review of three decades of the Port Pirie Cohort study".

Key TLAP documents including committee plans, commissioned research and meeting minutes were reviewed. Then, semi-structured interviews were conducted with a selection of TLAP members who represented Nyrstar, the Government and TLAP.

### Positive progress

The Searle report states: *The TLAP plan of activities appears thorough and ambitious, and represents a sensible approach to lead abatement based on research and lived experience. Although findings regarding the efficacy of community lead abatement interventions are variable, the multiple and sustained community- and family-centred interventions planned, along with the caseworker approach to individually tailoring and monitoring interventions has the potential to generate the greatest benefits. The proposed gains are relatively small compared with those from*

## 4. Summary of TLAP Activities (2016)

### 4.1 Broad-scale decontamination of Housing (Sub Program 1)\*

#### Key Actions:

- Joint TLAP/PPRC workshop to discuss clean-up strategies
- Agreement reached on priority actions

Sub Program 1 was originally intended to focus on wide-scale housing decontamination, however in light of experience from the 1980s, this opportunity will not be explored until the new technology at the smelter has been commissioned.

In the meantime, it has been recognised that an evaluation of possible methods of property remediation (including management and clean-up of legacy lead contamination) would be useful. This work, to a large extent, has been triggered by publicity in 2016 over the impact of land contamination on property development in Port Pirie. Currently property valuations carried out on behalf of banks rely primarily on the SA Health Soil Lead Concentrations Report (2013). This report commissioned by the Port Pirie Regional Council (PPRC) is not appropriate for the purpose to which it is being applied, and TLAP advocates a more pro-active approach with a better understanding of risks and management options. The concern is that, without this approach, development in the City of Port Pirie will be hampered by any economic uplift that may be generated after commissioning of the new facility.

Furthermore, the Searle Review pointed out that strategic planning around dust suppression (partly in collaboration with the Council) has been lacking and "remediation efforts must be strategically prioritised according to areas of highest need before larger-scale suppression initiatives can commence".

Significant consultation on this issue occurred in April 2016 as part of a workshop convened by TLAP and the PPRC. Participants included: the TLAP Committee, senior staff of the PPRC, representatives from SA Health, Nyrstar, the Environment Protection Agency of SA, technical experts and observers.

The purpose of the workshop was to explore soil management challenges in Port Pirie and work collaboratively towards a practical strategy to address these challenges. Port Pirie has a long history of lead production and past practices have left widespread land contamination from land filling, disposal methods, and from lead dust deposition.

It was noted that conventional land contamination clean-up practices are unlikely to be economic and an alternative long-term strategy would be required. As the smelter reduces its emissions, legacy and background lead will become more important in relation to blood lead and the focus of TLAP will increasingly shift to legacy lead management. Workshop participants agreed on the need to undertake four key pieces of work which would inform and assist the wider TLAP Port Pirie Clean-Up project.

These are:

- **Development of a Policy Framework** - This project aims to identify and review a range of potential policy instruments, tools, mechanisms and solutions to assist with the management of legacy lead in Port Pirie. This will culminate in the identification of and prioritisation of solutions. More information about this piece of work is described under the heading Sub-Program 3 – Legislation and Policy.
- **Diagnostic Tool & Clean-up Framework** - This project will investigate available community and individual site data to determine which remediation option will be the most effective at reducing lead exposure to children. Relevant information includes dust and soil collected by SA Health, the EHC and



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Nyrstar, spatial overlays of land use, ownership and receptor information. A township-level diagnostic tool will first be designed to identify areas of high concern which will lead to the development of a clean-up framework providing optimal remediation options.

- **Development of a Decision-Making Framework** – This piece of work aims to provide evidence of the comparative cost effectiveness of the various actions used to combat lead exposure. This will be an important resource for key stakeholders. For example, comparing the cost of reducing dust emissions using a street sweeper vs cost of removing a major source vs employing more health workers. The Committee expects the outcome of this work will further inform which strategies best meet the blood lead outcomes sought through the program and which investments will have the least impact.
- **Secure Landfill Site Selection Study** – Scope of work agreed, but not yet commissioned. As part of the broader TLAP objectives, construction of an appropriate soil secure landfill(s) for lead impacted soils generated as part of any future remedial works is required. The transportation fees to take impacted soils to IWS Dublin (the closest licensed soil receiving facility) are not considered economically viable. To this end, the development of a local soil secure landfill(s) will facilitate a significant reduction in transport fees, assist with promotion of the local economy and make the overall soil remediation process much more cost effective across the broader Port Pirie township.

As background for this work, TLAP engaged Jaydon Dietman to conduct a review in 2016 of the literature on contamination and remediation in Port Pirie. This work has proven to be a valuable resource for the TLAP Committee and for the work undertaken by external consultants engaged in activities connected to Sub-program 3.

It is recognised that implementing these initiatives will require significant collaboration with the Port Pirie Regional Council. Consequently, the PPRC has agreed to form a Section 41 Committee under the Local Government Act. The significance of this is further discussed under Sub-program 3.

While the need and support for this work was carried out in 2016, the development of strategy and planning was not commenced in earnest until early 2017.

\*The TLAP committee resolved to change the description of this sub-program to 'Legacy Remediation' at the June 2017 meeting to more accurately reflect the direction this piece of work is heading.

## 4.2 Early Intervention (Sub Program 2)

Key actions:

- TLAP investment in Case Workers
- TLAP investment to establish of EHC database
- TLAP investment in house modifications
- TLAP investment in modification of Port Pirie Community Childcare Centre to achieve lead safe standard
- TLAP investment in nutrition programs

Sub-program 2 is largely carried out by the Environmental Health Centre. The original agreement flagged that the State would continue to invest \$1.5m in the centre to continue its programs and TLAP would co-investment to enhance its resources and capability.

Recognised successful interventions for families with children recording high blood lead levels (as set out in the 2014 TLAP Report) included intensive caseworker management to encourage the behaviours required to reduce blood lead levels, reducing the amount of time children spend in highly contaminated environments (through childcare), modifying the environments that children are living in to make them more lead safe (housing modifications), and housing relocation for those families where modifications and other interventions are not having an impact.

## 4.2.1 TLAP Funding

### *EHC Case Workers and family engagement*

The 2014 TLAP Report (Section 2) stated the intention to have a caseworker visit each child and pregnant woman in the target group. This would increase active case management and the preventative focus (ie working with children aged 0 to 2 years with blood lead levels below 10 µg/dL). This was an ambitious but important goal.

Within this sub program it has been long established that case worker intervention is an effective strategy to support high risk families engage and participate in the behaviour change required to carry out exposure reduction strategies.

EHC utilises a combination of strategies to build rapport, facilitate and support families to reduce lead exposure risk, shift thinking and ultimately change behaviours. EHC's comprehensive and wholistic approach to early intervention also considers other priorities which impact blood lead levels, such as social determinants of health. Examples of exposure reduction strategies used by EHC caseworkers are minor home repairs or yard remediation, relocation (child care, Housing SA), subsidised child care, behavioural programs (Cook Eat Live, In home mentoring/role modelling cleaning programs) and also assisting in improving connections with other agencies (Child Health and Development team, Ante natal clinics, GPs, Housing SA, UCWSA, Centrelink).

Case workers are trained to engage families through assessment, support, education and mentoring and use a number of tools to assess and review individual clients' needs, type and level of intervention/s, such as: EHC Guideline for Managing Health risks of environmental lead, EHC Social Worker Clinical Priorities tool and Exposure investigation tool (which are also age specific). This information is used to develop an individualised Action and Intervention Plan, items required to enable the Action and Interventions plan are formally requested and approved via the Healthy Families Team Leader.

TLAP has invested in case worker resources and in a consultancy with The Australian Centre for Social Inclusion (TACSI) to raise the social profile of EHC and attract more families to participate in the EHC programs.

The TLAP contribution of an additional two Allied Health Professionals has assisted in EHC's ability to continue to provide effective lead-exposure reduction strategies with families as is evidenced by an increase in numbers of clients and families engaging with EHC programs (see table below). While the number of caseworkers has increased from three to five, the number of clients who are case managed has nearly tripled from 255 to 668.

Time period	Caseworkers	Total Clients	Average caseload per caseworker
Pre TLAP	3	255	85
Expected TLAP	5	435	87
Actual March 2017	5	668	134

Engaging new families, improving connections with other agencies, and offering more opportunities for peer groups and community interventions that shift thinking and ultimately behaviours, requires on-going commitment and increased resources for EHC to continue to be effective and sustainable, ensuring every child in Pt Pirie has a healthy start to life.

The number of families engaged through the caseworker model throughout 2016 has also increased due to the NHMRC recommendation to investigate lead exposure pathways for children with lower blood lead levels.

In 2014 TLAP commissioned TACSI to work collaboratively with the EHC to re-design their approach to engaging with the community to increase families and stakeholder connection with the EHC, particularly those families most at risk and least likely to connect with the EHC. This extensive body of work concluded in 2016 and TACSI's final report is a blueprint for change that the EHC can adopt to improve their operating model to meet their future challenges, equipping the EHC with the tools and methods such change requires.

### ***Intervention resources***

Raising awareness and minimising exposure risk through behaviour alone is not effective without also making changes to the child's living environment to reduce access to lead sources. Successful case management is also dependent on the availability of intervention actions that reduce or remove an exposure pathway such as childcare for the best outcomes.

The primary objective of providing families with these intervention items is to minimise lead exposure pathways within the home and provides case workers with the opportunity to motivate and support families to making sustainable behaviour changes (e.g. child care to remove from high risk lead exposure environment, providing high chairs so children aren't eating on the floor, minor yard and home repairs/sealing).

Intervention items, such as voluntary childcare, cleaning and waste removal are provided to families in response to exposure risks identified during home lead exposure investigations. These items assist with preventing or reducing lead exposure pathways for children in the home and assist families to have the tools needed to reduce lead exposure.

The increase in capacity of the EHC to provide caseworker support to families in the TLAP target group has meant that the number of intervention items provided has also increased.

Early in 2016 it was becoming increasingly apparent that demand for intervention items was starting to exceed the capacity of the Environmental Health Centre budget and a request was made to the TLAP Committee for additional funding.

TLAP has co-funded the following intervention activities in partnership with the EHC SA Health:

- Subsidised home modifications to reduce the amount of lead exposure within a high-risk child's home and living environment.
- Support for families to relocate to more suitable housing.

### ***Voluntary Child Care Intervention***

The EHC provides subsidised childcare for children at high risk of lead exposure in their homes. This intervention removes them from highly contaminated home environments to the lower exposure risk environment of a childcare facility and has been demonstrated to assist with reducing blood lead levels in a population of young children.

In 2016 TLAP invested in modifications to the Port Pirie Community Childcare Centre, which is considered to be in a high risk area in the community, specifically in the babies' room and the changing/bathing areas. The Port Pirie Community Childcare Centre is one of two providers used by the EHC.

### ***Subsidised Home Modification & Yard Remediation***

Significant investment was made in 2016 in modifying homes occupied by children with elevated blood lead levels to reduce exposure pathways in the home environment. Home modification is one of the interventions applied through the case management approach and to date has involved 41 families (52 children).

This intervention was heavily utilised during late 2015 and into 2016. A full audit of the cases funded to date to assess efficacy confirmed the guidelines, protocols, work practices and assessment criteria in place to guide the process were adhered to.

The audit confirmed:

- All approved and completed home modifications to date have undergone a comprehensive lead exposure assessment by the suitably qualified case workers.
- Multiple exposure pathways were identified within each exposure investigation, and multiple risk factors identified.

- All families were provided with supplementary interventions by the Environmental Health Centre, including childcare. It is to be noted that not all families accepted the intervention of childcare.
- Elevated blood lead levels or a well-documented history of elevated blood lead levels of previous children residing within the property was evident in all cases.
- Documentation has identified that co-contribution was considered in some cases; many families did not have the financial means to contribute to the required works.
- All contractors were invited to quote for all works; the audit has demonstrated that not all contractors chose to quote for all jobs.
- In most cases (with exception of those cases whereby work has recently been completed) blood lead levels have either stabilised or reduced.

A full assessment of the blood lead outcomes will be known later in 2017 when the cyclical testing of the children involved is completed. Further TLAP funding of this intervention will be on hold until these results are known. The database tool is urgently required to provide earlier evidence on whether interventions such as these are achieving the desired outcomes in terms of BLL.

### ***Voluntary Housing Relocation Intervention***

Moving families from a high lead risk environment to one that is lead safe is a proven intervention; however it is limited by the availability of alternate properties and the willingness of families to relocate. Voluntary housing relocation is an intervention option that is applied when other measures (such as intensive case work to encourage behaviour changes and childcare) have not been successful and home modification is not an option.

Currently five voluntary housing relocations have been brokered with Housing SA by way of direct leases between the family and Housing SA rather than a periodic head lease arrangement negotiated through CHSA and Housing SA. The potential involvement of Housing SA in this intervention was outlined in the 2014 TLAP Report and is an excellent example of a beneficial partnership between the two government agencies. Evidence suggests that this intervention has a significant positive impact on reducing BLLs.

### ***Improved data management***

The Searle Review recommended that the EHC database upgrade be expedited as a matter of urgency, identifying the need for improved data collection and subsequent evaluation and planning as a critical pathway for TLAP.

Consequently, Country Health advised that a better approach would be to utilise SA Health's Client Management Engine (CME) as a framework for a customised EHC data management system. TLAP has subsequently invested in the development of a specific Environmental Health Centre module within the SA Health CME.

It is anticipated that this module will enable early detection of the need for caseworker and intervention services. It will also enable TLAP and EHC to track their investment in interventions, monitor the effectiveness of those interventions, and make decisions on changes that are then identified and needed.

The CME will be rolled out in 2017.

### ***Nutrition Program***

Research has demonstrated that a healthy diet along with good personal hygiene such as hand washing is effective when working to lower children's blood lead levels.

TLAP works to ensure (where possible) young children in the Port Pirie community are provided with access to milk, bread and fruit and vegetables through nutrition programs at childcare and kindergartens on a weekday basis to minimise any potential lead absorption. The success of this program has continued throughout 2016 with subscriptions remaining high and full compliance with procedures. Eligibility for the support of TLAP Nutritional program is predominantly ages 0-4 years as this is the age group most susceptible to lead absorption and



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therefore most at risk in the community. Without TLAP's continued support of this initiative, many volunteer run school, kindy and childcare centre breakfast programs would likely not continue.

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### ***Support for the Uniting Care Wesley Country SA Port Pirie FoodHub***

UCWCSA, in partnership with Nyrstar, Foodbank SA and other community organisations developed the Pirie Community Foodhub project in 2012. The aim was to provide greater food security for the residents of Port Pirie and the surrounding regions.

The Port Pirie Foodhub is an alternative location for grocery shopping where items are sold at a lower cost than the mainstream supermarkets. The majority of stock is purchased from Foodbank SA, who have partnered with local food producers, manufacturers and retailers to purchase core staple items at discounted rates.

In early 2016 TLAP was advised that due to overheads and other factors the Port Pirie Community Foodhub was at risk of closure. Many families involved with EHC caseworkers benefit from the Foodhub service and an injection of funds was provided by the Targeted Lead Abatement Program (TLAP) upon that Committee's acceptance of a robust and detailed sustainability plan.

The plan had a life span of 12 months, ending 30/6/17 and the Foodhub committee is continuing to explore and embed mechanisms which will eventually lead to self-sufficiency and sustainability.

## **4.3 Legislation and Policy (Sub Program 3)**

### **Key Actions:**

- Establishment of consultancies to develop a policy framework, and diagnostic tools to aid decision making
- Formalised relationship with PPRC, establishment of PPRC Section 41 Committee

TLAP and the PPRC agreed that the development of a policy framework is required to capture the most efficient and effective planning and development tools to assist the PPRC and other stakeholders with planning decisions that mitigate legacy lead in the Port Pirie environment.

TLAP has continued to strengthen its relationship with PPRC through regular meetings. Council have been invited and attend the monthly TLAP Catch Up meeting which enables a sharing of ideas and works in progress.

Following a presentation to Council in July 2016, the need to establish a more formal mechanism of engagement was noted. To this end a Section 41 Committee has been established to deal specifically with the joint work of TLAP and the PPRC. This Committee will clearly play a major part in rolling out new policy and remediation initiatives associated with land contamination in Port Pirie, including the four priority initiatives identified through the workshop process described in Section 4.2 (Sub-Programme 1):

1. Development of a Policy Framework
2. Diagnostic Tool & Clean-up Framework
3. Development of a Decision-Making Framework
4. Secure Landfill Site Selection Study.

The Section 41 Committee comprises:

- Presiding Officer - Cr Alan Zubrinich, Port Pirie Regional Council
- Cr Darryl Johnson, Port Pirie Regional Council
- Cr Joe Paparella, Port Pirie Regional Council
- Cr Leon Stephens, Port Pirie Regional Council
- Julie Mitchell, Independent Chair (TLAP Committee)

- Gail Bartel, Nyrstar Representative (TLAP Committee)
- Rob Thomas, Dept of State Development Representative (TLAP Committee)

The work of the Committee will begin in 2017. Terms of Reference are located: <https://tinyurl.com/lvf26lv>

## 4.4 Community Dust Management (Sub-program 4)

### Key actions:

- Increase in community cleaning activities
- Targeted onsite investment and co-investment from Nyrstar subcontractor
- Salt-bush planting in rail corridor
- Nursery expansion
- Formalised relationship with the PPRC

As set out in the 2014 TLAP Report, while current emissions from the smelter continue in the lead up to Transformation, the focus of the subprogram is to continue to mitigate exposure to the community through a range of measures including stabilising dust in open spaces, the thorough and regular cleaning of public spaces where children gather, and to maintain current on-site actions at the smelter that reduce lead moving into the community.

### 4.4.1 On-site dust reduction

A significant component of TLAP's investment goes into reducing sources of dust and emissions on site at the smelter. This investment involves minor capital works and maintenance that would not be captured by major capital works associated with the smelter redevelopment.

TLAP purchased a portable industrial vacuum cleaner that was robust enough for long term use in the slag fumer and kilns areas. Spillage of raw and roast fume is a common problem and is a significant contributor to lead bearing dust generated from this area of the site. The new vacuum unit cleans better, saves time and reduces manual handling compared to shovelling or other less effective systems that have been used in the past. The vacuum cleaner also has a high-pressure water spray which enables removal and clean-up of difficult debris such as caked on build-up that has been in place for many years. Overall, the unit will enable operators and maintainers to improve housekeeping and cleanliness in the slag fumer and kilns while other projects are implemented to eliminate the source of fugitive emissions or spillage.



Industrial Vacuum Cleaner – purchased with TLAP Funds

A misting system used to manage dust during ship unloading to the Nyrstar site was installed in the blast furnace enclosure to see how it would perform in this application. Flinders Logistics have absorbed the costs of the initial set up and maintenance of the misting system as a contribution to TLAP.



Misting sprays used in dust suppression around the blast furnace

Other works included repairs and sealing of industrial ventilation systems, installation of additional dust suppression sprays, and sealing of unsealed areas of the site to improve cleaning effectiveness. Repairs were also made to material storage sheds and conveyor canopies to contain dust emissions or spillage.

#### 4.4.2 Off-site Dust Reduction

Dust management in the city is a critical part of TLAP's investment activities. There are many surfaces in the community that collect dust and which increase the risk of exposure leading to elevated blood lead in young children. TLAP has identified that the most cost-effective approach is to invest in its own team focused on dust management which ensures the quality of the work done.

In 2013 testing of community infrastructure – playgrounds, bus shelters, public seating and eating areas – showed elevated lead levels particularly at community infrastructure that was close to the smelter, in the fall out area of emissions from the smelter or near high dusting areas of the community.

As children in the at-risk age group access this infrastructure, a community cleaning program has been put in place where two cleaning units (truck and high pressure cleaning equipment) each day clean these areas. As the cleaning program is required 7 days a week, a team of 4 cleaners is required to ensure coverage of the program. Subsequent testing has demonstrated a reduction in lead contamination post cleaning to below 400mg/m<sup>2</sup> which is the recommended health standard accessible to children. However recontamination can occur within 24 hours or over the course of a number of days depending on the proximity to the smelter of the infrastructure, lead in air or dust movements. Therefore while recontamination continues to occur the cleaning program is an ongoing requirement.

The Community Cleaning Team not only maintain two cleaning units in the community 7 days-a-week cleaning 12 community playgrounds and in excess of 20 bus shelters, they also provide labour at the plant nursery to expand its capacity to 60,000 shrubs and plants per annum which are subsequently planted in the community to reduce dust movement and therefore lead in air.

Community cleaning requirements have also grown in 2016 with the additional cleaning of:

- Footpaths adjacent to Little Beans Play café (situation in an extreme high-risk area)
- Woolworths entrance off Ellen Street during refurbishment work

- Assistance with PPRC projects such as the Florence Street upgrades
- Watering of the rail corridor and other planted areas
- Kingston Road Early Learning Centre upgrades



The Community Cleaning team watering saltbush in the rail corridor.

TLAP has recognised that mobilisation of dust can be reduced through greening and planting of vegetation in street scapes and open spaces. However, Port Pirie provides a difficult growing environment for plants and TLAP decided to invest in a plant nursery to focus on production of seedlings that are well adapted to this harsh environment. This investment has been highly successful and has resulted in high demand for seedlings from other stakeholders in Port Pirie. In 2016, approximately 1200 plants were donated to early learning centres, the EHC, the Port Pirie Police Station, the Port Pirie Regional Council and other community groups. Further expansion plans are set for 2017 with additional seed raising beds, and clearing of the site to increase grow out areas and increase irrigation networks.



One of the TLAP funded members of the Community Cleaning team at work in the plant nursery.

Saltbush seedlings grown at the nursery were used to plant in the rail corridor which is highly contaminated, the aim being to reduce lead contaminated dust finding its way into surrounding homes. **This was one of the recommended activities outlined in the 2014 TLAP Report (see Section 2).**

This work involved:

- Stabilising the roads within the corridor with Dust-ex (or similar) to minimise dust from vehicle traffic

- Revegetation of a tract of land with salt-bush to contain dust movement through the corridor.

Above average rainfall in 2016 led to the successful strike rate throughout the planted area of the rail corridor. The growth and establishment of the plants, which were planted in late July, has exceeded expectations with many hedge rows now quite evident and likely to be reducing dust movement into the Solomontown area.

Plants in the heavily ballasted areas (the first 12 rows) have not performed as well. A replant of these areas is planned for 2017.



Saltbush planting in the rail corridor

Discussions with Council have targeted many new joint projects that will see nursery stock utilised throughout the Port Pirie Region.

These projects include greening of:

- Waste Transfer Station
- Flinders View Playground
- Exposed waterways and drainage areas
- Exposed land allotments

TLAP Plant nursery stock is being supplied to aid dust mitigation strategies at the PPRC Waste Transfer Station site and the Flinders View playground. Bark chips used for soft fall protection tend to accumulate deposited dust and other options are being investigated. TLAP is also investigating the best materials for use in upgrade and repair of footpaths, again with an emphasis on materials that don't accumulate deposited dust.

In addition to the provision of plants, TLAP will support Council with the watering to assist plants to become established.

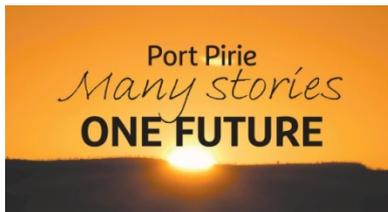
## 4.5 Stakeholder Partnerships and Engagement (Sub Program 5)

**Key Action:**

**Investment in a campaign to positively position the momentum for change in the Port Pirie community**

A high priority and focus for Sub-Program 5 during 2016 was the development and execution of a community awareness campaign aimed at changing the perceptions and the reputation of the Port Pirie community. For many years the community has been divided on the issue of shining a light on the issue of lead and there had been strong opposition to past campaigns primarily focused on lead. Many people believed that outcomes of such campaigns (however positively portrayed) negatively impacted the community.

Repositioning the reputation of the community and the role of the smelter is seen as a vital part of the transformation occurring in Port Pirie. From TLAP's perspective such a campaign provides a strong platform to change attitudes towards and within Port Pirie and underpins community ownership of the solutions required to properly manage lead in their environment.



Phase one of the strategy was the development of a campaign aimed at changing the story about Port Pirie. The result was, "Many Stories - One Future", an initial 28-minute documentary combining historical information and interviews with residents of Port Pirie talking about their community, its past and its future.

The documentary was followed by 8 x 50 second mini documentaries that focused on individual stories about the smelter and Port Pirie community. The overwhelming response to this campaign has been highly positive with many nearby communities expressing a strong desire to have access to a similar campaign.

The documentary was aired on Southern Cross TV (free to air in a partnership with the network) and was an immediate success with in excess of 74,000 hits on the website in the first 5 days. This is an outstanding outcome given that the population of Port Pirie is approximately 13,000.

An additional six mini documentaries were produced in the second half of 2016 and have commenced airing in January 2017 as a pre-cursor to the roll out of phase two of the campaign. In parallel a DVD of the documentary was produced which has required a second print run of an additional 2,000 copies due to the popular demand received. The DVD's are available at the Port Pirie Tourism and Arts Centre further assisting to positively position the community to visitors to the city and the region.



Phase two of the reputational campaign has seen key stakeholders join together to develop and drive a campaign aimed at changing the wider perceptions and reputation of Port Pirie. TLAP not only gains from the outcome of the campaign but also from the interaction and engagement with key stakeholders in this setting. It is anticipated this in turn will lead an improved understanding of the redevelopment and the beneficial community health outcomes, and acceptance and ownership of the changes that will be required by the community to properly manage lead in their environment and achieve the benefits in terms of improved health and economic outcomes as a result.

As an outcome of an initial workshop held with 40 community representative to discuss and outline a vision for the change campaign, the Port Pirie Chamber of Commerce, Regional Development Australia Yorke & Mid North, Port Pirie Regional Council, TLAP and Nyrstar formed a committee to progress this work.

The committee has met regularly since the workshop and after months of intense work, lobbying and community engagement, phase 2 was launched at a Chamber of Commerce hosted dinner in early February 2017.



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The Port Pirie Come See Change campaign will invite people to come to Port Pirie, to see for themselves the positives things the community offers so they change their opinions, change their views, then change their minds – to tell a different story about Port Pirie. The intent is to link positive changes to the lead story in Port Pirie to community support and expectations across the broader community. The aim is to motivate the local community to engage in change in part because they can see the benefits it delivers in terms of broader community perceptions about Port Pirie, its environment and community.

The continuation of the development and roll out of the campaign will be the focus of subprogram 5 in 2017.

TLAP's co-funding for this ongoing reputational campaign will continue throughout 2017 which will be allocated to several initiatives. Funding will include support for the official launch, development of a website, media scheduling (TV, Radio and print), song rights, banners, posters, billboard, fence advertising etc.

TLAP continues to make strong connections in the community. In 2016 community activities included:

- Police station landscaping – provision of plant stock and labour to plant out a dust prone area.
- Direction to Community Gardens Group – Sharing of SA Health advice around gardening in Port Pirie in collaboration with the EHC.
- Community Events – Children's Day in the Park, Pageant, Children's Festival, Children's Centre Beach Party – Highly visible and interactive public and community engagement with TLAP focussed activities with families and children.
- Landscape assistance and provision of TLAP Nursery plant stock at Solomontown Kindy and Kingston Road Early Learning Centre

## 5. Impact of TLAP programs

In March 2015, SA Health published an analysis of blood lead levels for 2015. This shows that the geometric mean for children under the age of five years is 4.3 µg/dL. This is a substantial improvement from 2013. This measure is very similar to the latest blood lead results for the community living in the vicinity of the Teck smelter.

This is surprising given that Teck has already undergone redevelopment and Port Pirie has not. This outcome is considered even more surprising given that the last three years have been particularly dry at Port Pirie. Dry conditions normally generate more dust and potentially greater lead uptake in the community.

### How can the Port Pirie result be explained?

While smelter emissions have been variable over the recent period, the average lead in air concentration in Port Pirie has halved over the past two years even though the smelter redevelopment has not been commissioned. There are a number of reasons for this, including exceptionally favourable wind conditions with an unusual prevalence of southerly winds in 2014 and 2015 which blew smelter emissions away from the town.

However, there also been significant improvements in management practices and emission controls at the smelter in the last two years:

- Site communicated wind forecasts in combination with high wind protocols have been used to ensure that activities with the potential to generate dust are not undertaken under unfavourable wind conditions. Real time dust monitoring in combination with SMS and email alerts have also been used to alert any action required to address sources of dust.
- Environmental Improvement Plan (EIP) actions agreed with the South Australian EPA have been carried out including improved dust control associated with unloading, improved process controls for the sinter plant and blast furnace, and improved dust control on stockpiles, and
- Nyrstar's Enterprise Excellence Program including a "Broken Windows" campaign requires every work area to be responsible for returning any deficient facilities in their work area to an agreed Standard. This

has resulted in significant improvements in housekeeping across site including a reduction in spillage and dust.

These initiatives halved the number and intensity of high emission spikes which in 2013 accounted for more than 50% of the average lead in air outcome.

TLAP has already made a contribution to these improvements, through investment in:

- environmental hygiene within the smelter,
- the EHC Early Intervention subprogram,
- community dust management, and
- raising community awareness and engagement.

SA Health has spent many years investigating and reporting on blood lead in the Port Pirie community and supports the view that a significant portion of the improvements can be attributed to TLAP.

In recent years SA Health's Blood Lead level Report has shown a plateauing in improvements recorded in lead levels of children possibly associated with smelter emissions. This suggests that town dust control will become increasingly important as background lead in air becomes an increasingly significant component of total lead in air.

## 6. NHMRC Blood Lead Guideline

In May 2015, NHMRC published revised health guidelines for blood lead. The NHMRC moved the investigation level from 10 micrograms per decilitre ( $\mu\text{g}/\text{dL}$ ) to 5  $\mu\text{g}/\text{dL}$ . TLAP's focus is consistent with NHMRC's recommended investigation level of 5  $\mu\text{g}/\text{dL}$  and strengthens the use of SA Health's investigation level of 4  $\mu\text{g}/\text{dL}$ . However, the question arises as to what impact this change has on reporting and performance regarding blood lead in the community.

This issue has been discussed at length by SA Health and by TLAP. It has been agreed that both reporting levels (5 and 10  $\mu\text{g}/\text{dL}$ ) are useful and performance against each should be measured and maintained. While 5  $\mu\text{g}/\text{dL}$  provides a signal that monitoring needs to occur and potential action taken, 10  $\mu\text{g}/\text{dL}$  generates an even stronger signal demanding more intensive action. For the Early Intervention Program, this is presented in the form of tiered interventions – case manager behavioural changes, house modifications, and childcare strategies.

## 7. Conclusion

Observations suggest that TLAP has already brought about important reductions in blood lead in children. Recent blood lead data compares very favourably with results in the community of Trail. However recent results for the Hoboken community (adjacent the Umicore smelter) demonstrate that things can go wrong. We must continue to benchmark our performance and learn from other smelters and improve the use of data in the decision making process. If we remain focused and vigilant post commissioning, the Port Pirie smelter could become a world leader in environmental performance. At present the TLAP program is having the impact required to keep blood lead levels as low as possible prior to transformation and is sufficiently established to be able to make greater impact post-transformation in order to meet the program objectives.

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